



ACKNOWLEDGEMENTS

STUDY GROUP

Yogita Lokhande
Nilesh Rajachyaksina
Rohit Nijumdar
Nidhi Batra
Benita Merezes
Christen

FELLOWSHIP CO-ORDINATOR

Pankaj Joshi

FELLOWSHIP SPONSORS

Urban Design Research Institute (UDRI), Mumbai

PUBLICATION SPONSORS

Urban Design Research Institute (UDRI), Mumbai

PHOTO CREDITS

The Study Group

BOOK DESIGN AND PROCESSING

The Study Group

PRINTING

Urban Design Research Institute (UDRI), Mumbai

Geographical information systems (GIS) are widely acknowledged as valuable tools for facilitating informed spatial decisions, and have become indispensable to the processes of planning and management in most countries across the world. GIS is soon becoming the data management standard not only for planning the use of land and natural resources, but in general for everything to do with geographic points on the earth surface, and naturally its applications range all the way from effecting strategic military and government decisions to aiding commonplace tasks such as choosing the shortest possible bus route to a selected destination. As such, over the years the GIS has evolved into a technology that is used extensively by Governments at National and State levels, industries, corporates as also other private agencies to help plan, design, engineer, build and maintain information and knowledge that concerns and effects our everyday lives. Since the mid 1980s, and particularly starting in the early 1990s, GIS has grown into a very substantial application of electronic data processing, with annual software sales approaching \$1 billion, and a related data and services industry worth perhaps ten times that. GIS has been quick to adopt recent technical innovations, such as the Internet and World Wide Web (WWW), object-oriented programming and database design, and universal standards. It is estimated that on the order of 10,000 are employed directly in the GIS industry; that on the order of 100,000 are trained in GIS use and apply it regularly in their jobs; that on the order of 1,000,000 have received some level of technical exposure to GIS; and that on the order of 10,000,000 regularly use GIS-based services such as computer-derived way-finding instructions. While its direct usage in the public realm may not be common in our country, National initiatives such as the Natural Resources Data Management System (NRDMS) of the Ministry of Science and Technology of Government of India as also private bodies such as the Environmental Systems Research Institute (ESRI), India have involved themselves in establishing comprehensive databases and conducting valuable research in the fields of agriculture, hydro-geology, mechanisms for local governance and so on which hope to help manage and monitor the country's development better.

And yet over its short history of the last 3-4 decades, its lineage from a strong cartographic map-making tradition has made the technology subject to academic debate and scepticism regarding its theoretical position as another form of ethnography - elitist, exclusive and prone to most cartographic conventions and limitations that have been criticised systematically within Colonial and Oriental discourses. The power structures inherent to the technology and the severely technocratic processes of decision making that it facilitates have been the source of most social critique levied against it. Besides shadows of doubts are being raised about the very validity of the base data used to conduct analysis and take important National decisions on development and intervention. This paper, will examine and understand the major issues and concerns that have developed regarding this technology and in the process attempt to raise doubts around the 'mammoth' not so much as to raise it out more to humble its overwhelming pre-eminence as the only complete tool for analysis and decision making within the process of planning and directing development. Beginning with the evolution of the GIS and elaborating on its basic tenets, the article will work through the social critique of the technology developed in the late 1980s and 90s so as to establish the broad failures of the system and then summarise through a presentation of the new forms of GIS that have emerged as a response to such criticism; namely the radical new ideas of open source, of participation, and indeed of Community GIS.

In 1969, a highly celebrated book by the name of "Design with nature" was published. In this work the author Ian McHarg presented two fairly radical ideas - one had to do with integrating man's ecological settings and systems within the act of development and planning so as to achieve a balanced ecological development while the second set out a new cutting edge method for achieving this end.

MUTP MUIP SEZ

The latter became a radically new tool for effecting planning decisions through an analysis of cross-factorial effects on land and its use. McHarg's method described how different information sets can be layered and combined geographically to obtain a multidisciplinary analysis of a region's ecological sensitivity and in turn identify suitability of land for different types of development and land use. McHarg called this new method "physiographic determinism" achieved by overlaying various maps (produced on transparent plastic Mylar sheets) depicting varying (and often cross disciplinary) data sets such as landforms, soil types, vegetation patterns, demographic data and so on. This method was able to reveal far more information about a particular area than was possible through a singular opaque map. Thus quite simply a cadastral survey map when overlaid with layers such as soil suitability, availability of resources and so on could generate complex and more substantial parameters for effecting planning and locational decision making processes. Since then this method of rational establishment of optimum decisions regarding land has found computer adaptations / re-adaptations and has evolved through several parallel researches all over the world to take on its present form, which we have

Following the formation of the Mumbai Metropolitan Region in the 1970s, the city experienced three fundamental impulses which have transformed movement patterns in the city substantially. The powerful emergence of the need to have better East-West movement corridors has been largely on account of the radical restructuring within the city of functional and spatial geographies caused by these impulses.

Firstly, the industrial relocation policy of the 1970s saw the erasure of the manufacturing sector form within the city and their movement to several dispersed locations within the hinterland. This resulted in the formation of large chunks of empty land within the city, particularly in the Mill lands as also in the industrialised Eastern suburbs of Kurla, Mulund, Bhandup, Ghatkopar etc.

The entry of the global capital following the reforms of the 1990s, has led to the emergence of new programs, new consumption capacities in the city and so on leading to new demands for high-end housing, commerce and office spaces in the city. In the western suburbs this came as the development of pockets into gated apartment types, malls and multiplexes, a pattern which seems to mirror itself within the eastern suburbs as well usurping hitherto industrial lands now lying vacant.

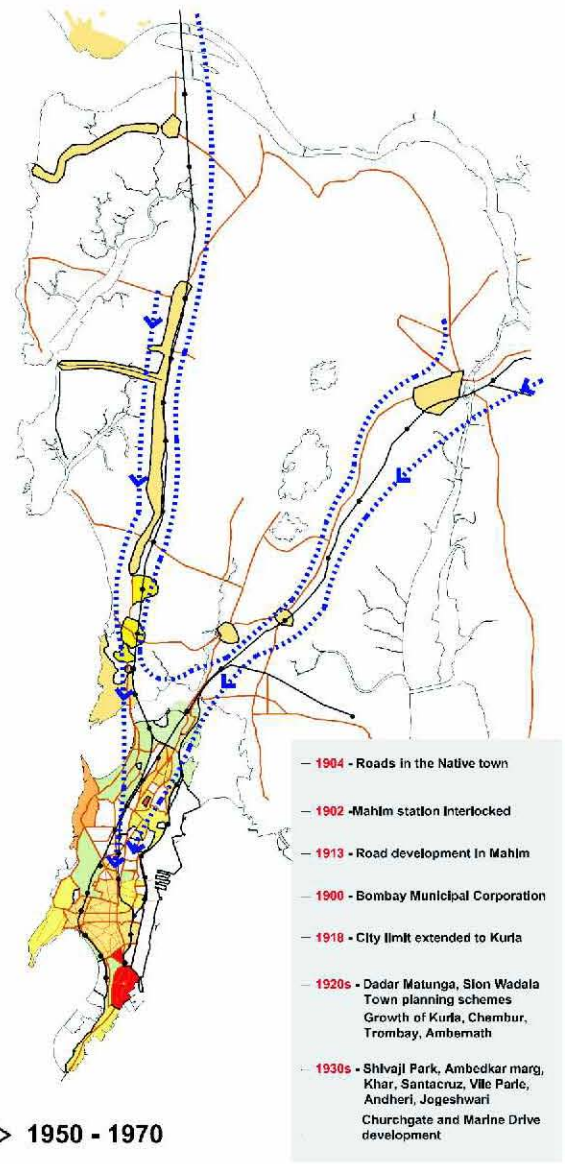
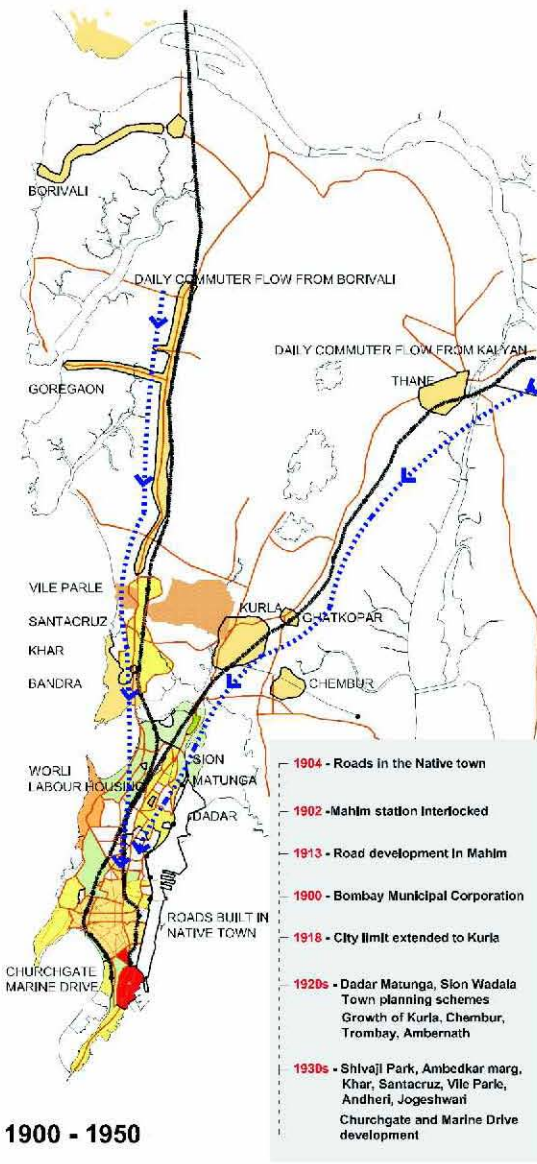
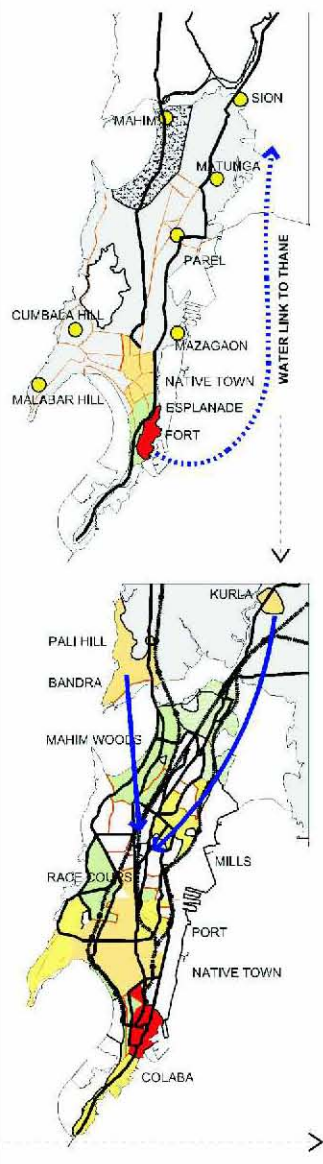
The third impulse can be seen in the form of the creation of a new CBD at Bandra-Kurla Complex and the subsequent growth of the surrounding areas in and around the airport into prime office spaces. This has led to the emergence of these areas as prime business areas in the city.

More generally a functional geography is emerging which is creating an East-West movement in addition to the traditional North-South movement as we shall see in the next panel.

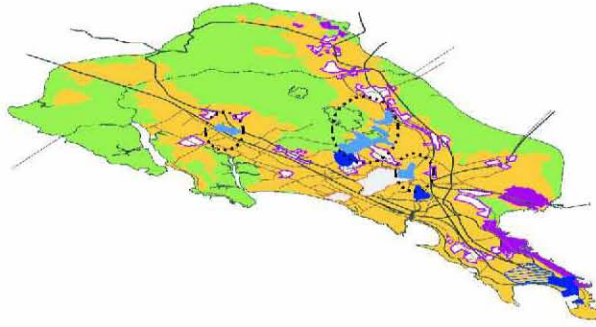
Following the formation of the Mumbai Metropolitan Region in the 1970s, the city experienced three fundamental impulses which have transformed movement patterns in the city substantially. The powerful emergence of the need to have better East-West movement corridors has been largely on account of the radical restructuring within the city of functional and spatial geographies caused by these impulses.

Firstly, the industrial relocation policy of the 1970s saw the erasure of the manufacturing sector form within the city and their movement to several dispersed locations within the hinterland. This resulted in the formation of large chunks of empty land within the city, particularly in the Mill lands as also in the industrialised Eastern suburbs of Kurla, Mulund, Bhandup, Ghatkopar etc.

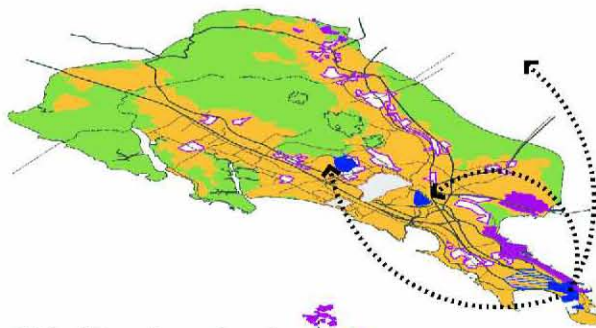
- 0000 - Fort
- 0000 - Native town
- 0000 - Fort wall and Esplanade
- 0000 - European suburbs
- 1771 - Hornby Vellard
- 1803 - Sion causeway
- 1830 - Road to Deccan
- 1838 - Colaba causeway
- 1845 - Mahim causeway
- UPTO 1850**
- 1851 - First cotton textile mill
- 1853 - VT to Thane rail link
- 1865 - Grant road to Basselin
- 1870 - Bombay Port Trust
- 1880s - Pali Hill development
- 1885 - Bandra station
- 1890s - Initial development in Juhu
- 1895 - City Improvement Trust
- 1899 - Sion - Matunga town planning schemes
- 1899 - Growth of Kurla
- 1850 - 1900**



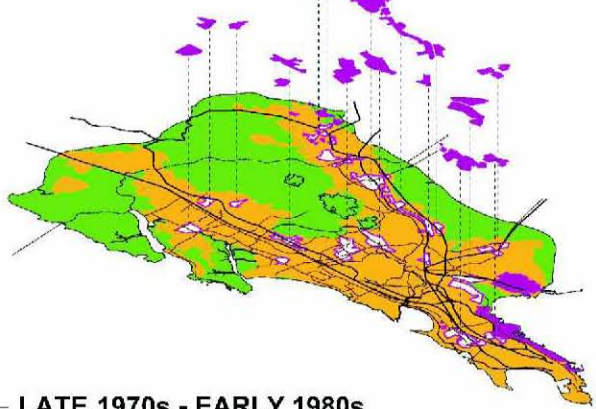
Entry of new programs



Decentralisation of CBDs

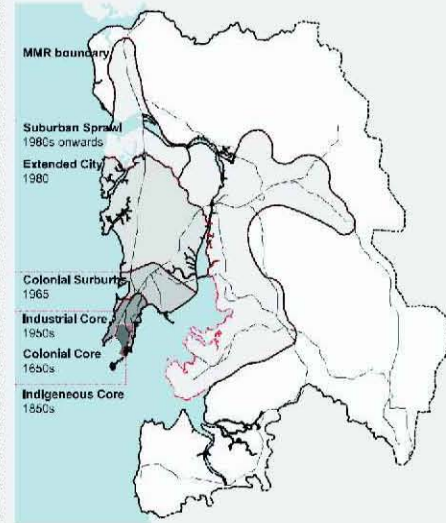


Shift of Formal manufacturing

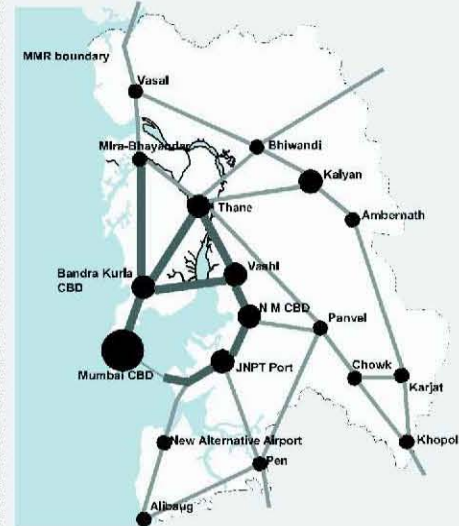


LATE 1970s - EARLY 1980s

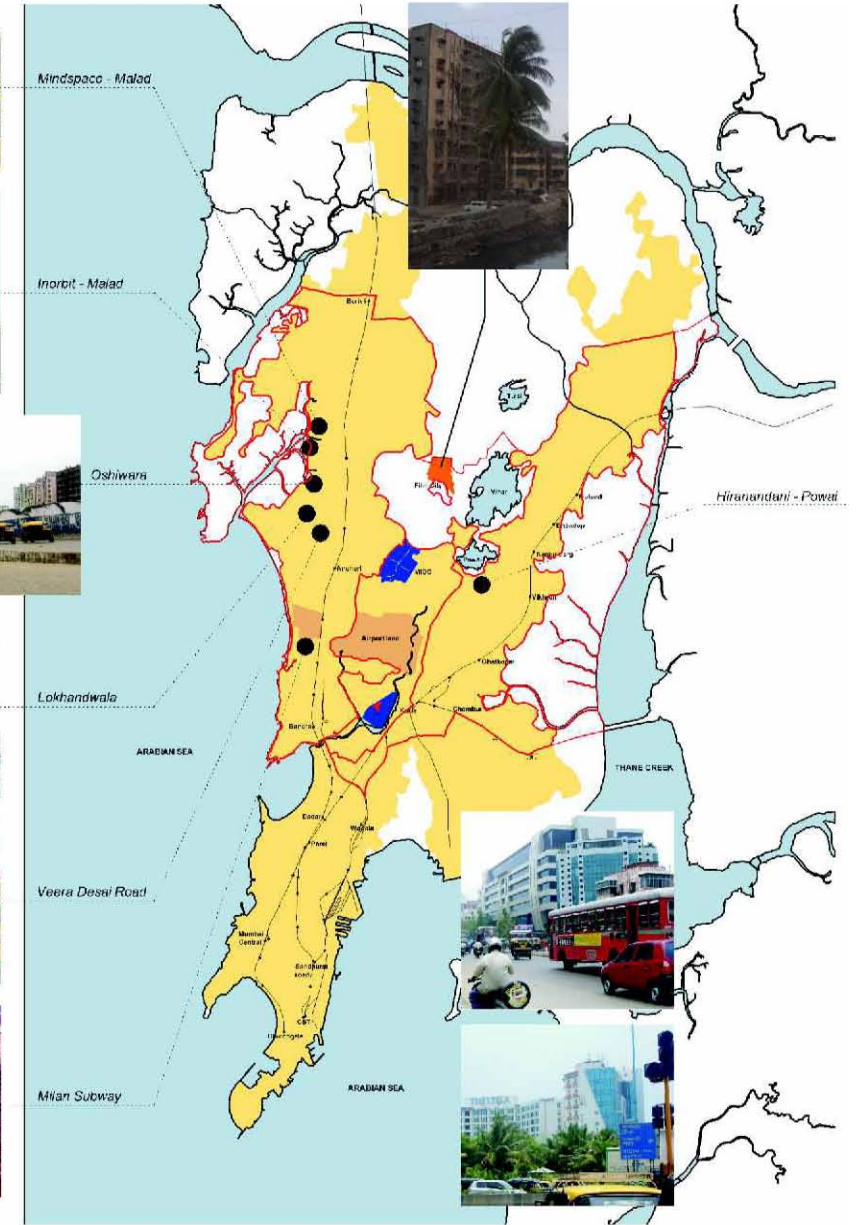
Growth of the City



MMR proposal for growth of the Region



PARALLEL GROWTH - REGION



ZONE 1 Western Mixed Zone



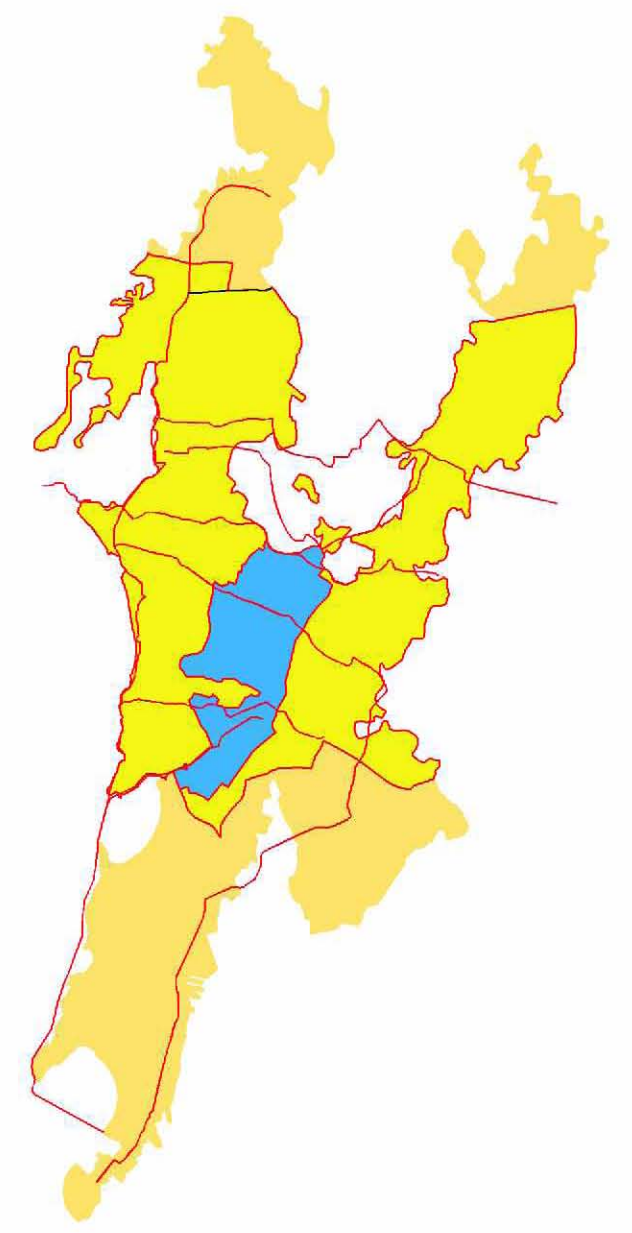
ZONE 2 Central CBD

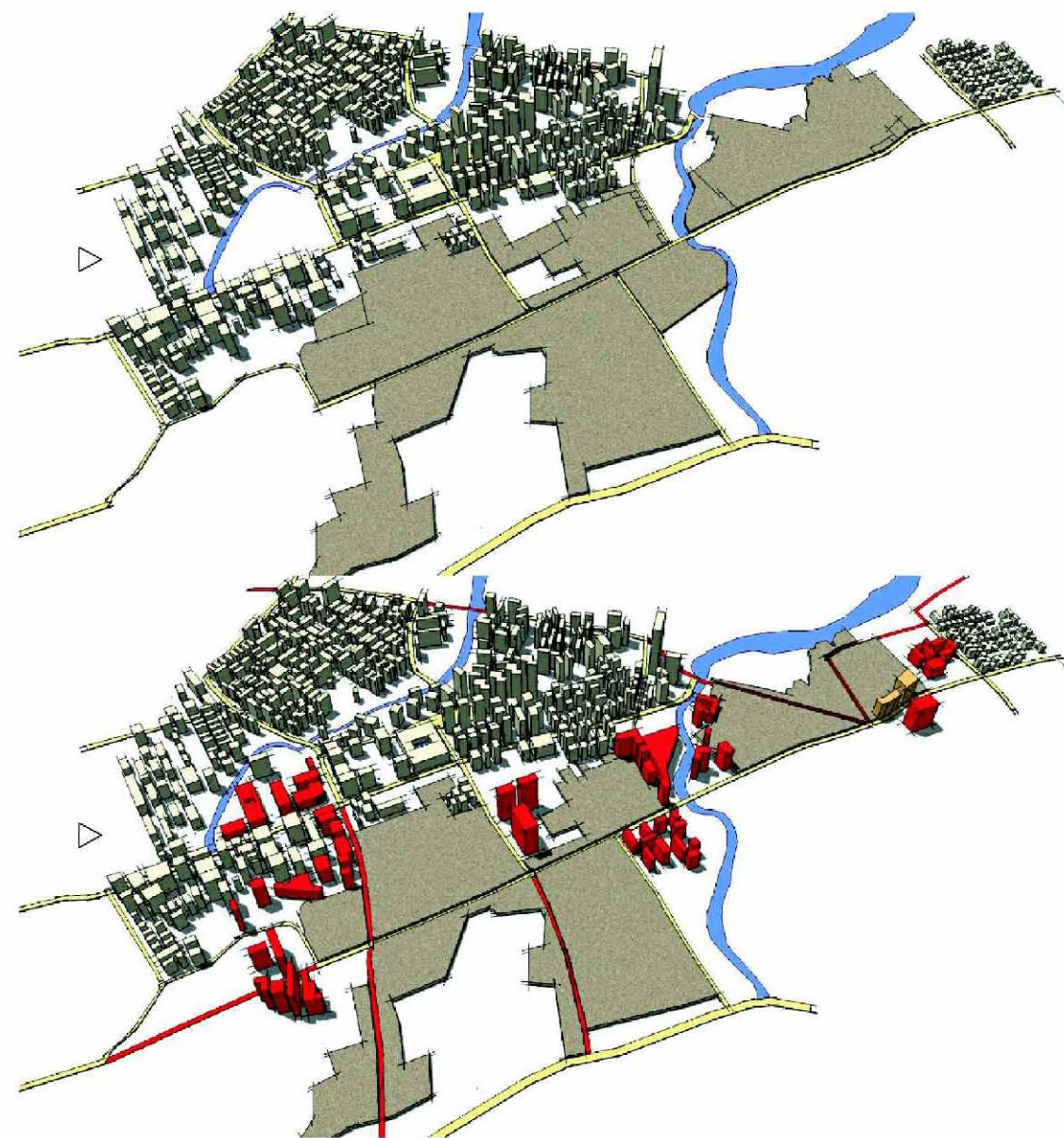
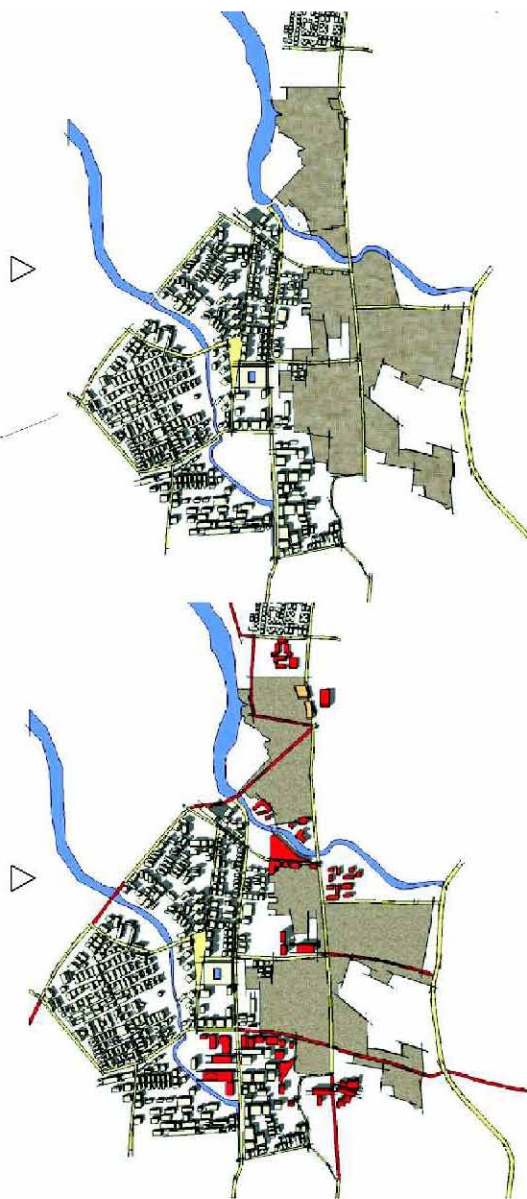
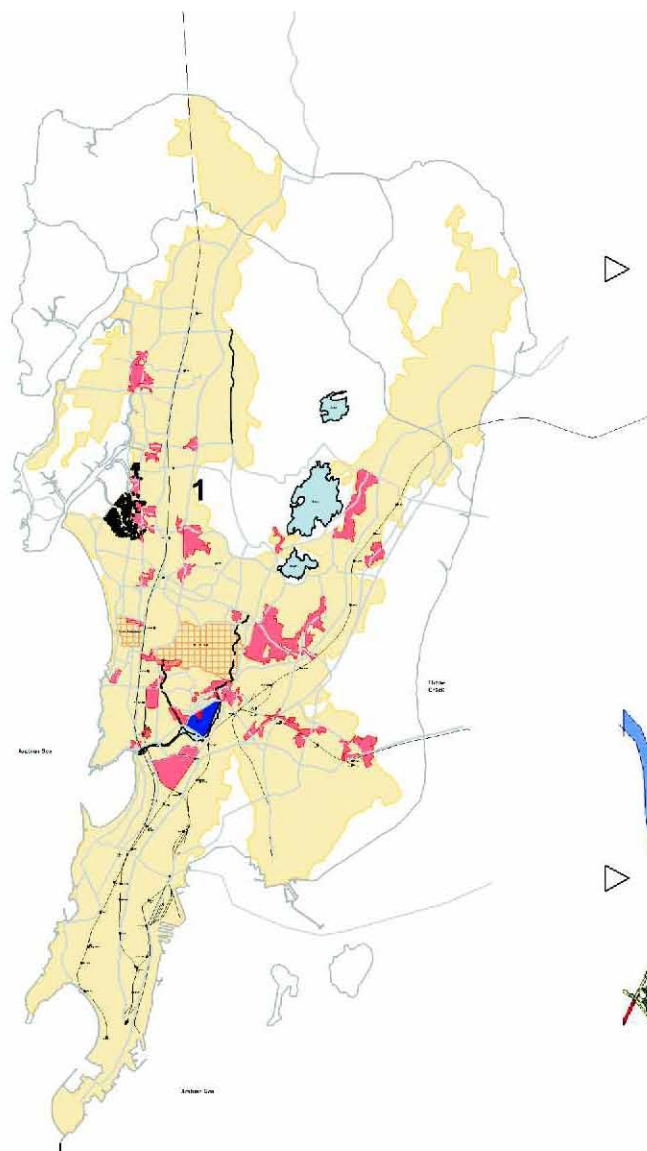


ZONE 3 Eastern Mixed Zone



ZONE



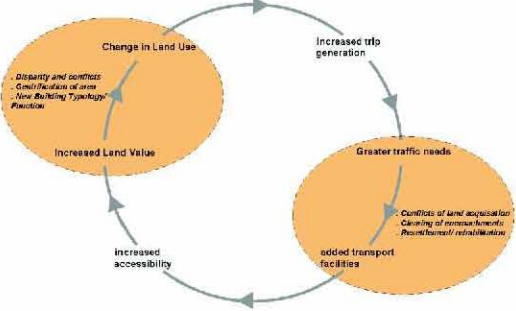


ASSESSMENT OF MUDP- MUIP PROJECTS

Planning, as a code has been to have prime importance for creating conditions of balanced growth, reducing civil strife and maintain use values and creating exchange values for spatial elements. It was always oriented towards establishing a social control and establishing harmony through integration. It is meant to be a socio-spatial ordering system. The above is the outlook with, which we judge the projects of the infrastructure development of 'MUDP-MUIP' in the city of Mumbai. Also, it is the aim of the study to project the possible changing geography of the Mumbai city, with infrastructure development as a determinant of the new urban form.

Infrastructure projects of MUDP- MUIP as generator of Urban Form

These new project decisions result in the economic flow of goods and the movement of people within and through regions – and influence the proportion of a region's population that live or work in compact, mixed use walk-able environments, or in communities with larger lots and increased car reliance. The choice between transit, highway, and pedestrian investments play a critical role in shaping the activity patterns of the young, old, and the disadvantaged. The mode and location of a transportation investment can create or eliminate access to important destinations in the daily lives of area residents. The "urban form" of a region is largely the result of the transportation investments decisions that get made. Correspondingly, the investments made today, will shape the urban form of regions in the future. Land use patterns respond to transportation investments – and determine the value of a given location – and can create a magnet for, or reduction of development. They determine 'kind' of development and in the end is influencing the permissible economic activity, which can reside in the new 'developed, with infrastructure' area. Resulting travel and activity patterns influence air pollution, greenhouse gas production, energy consumption, physical activity levels etc. The linkages between transportation investment, land use, economic activity and these environmental and health related outcomes are becoming more and more central to policy debates over how we should grow our communities and regions. Thus, the MUDP-MUIP projects have hidden consequences and it is those impacts that are assessed.



Methodology of the study

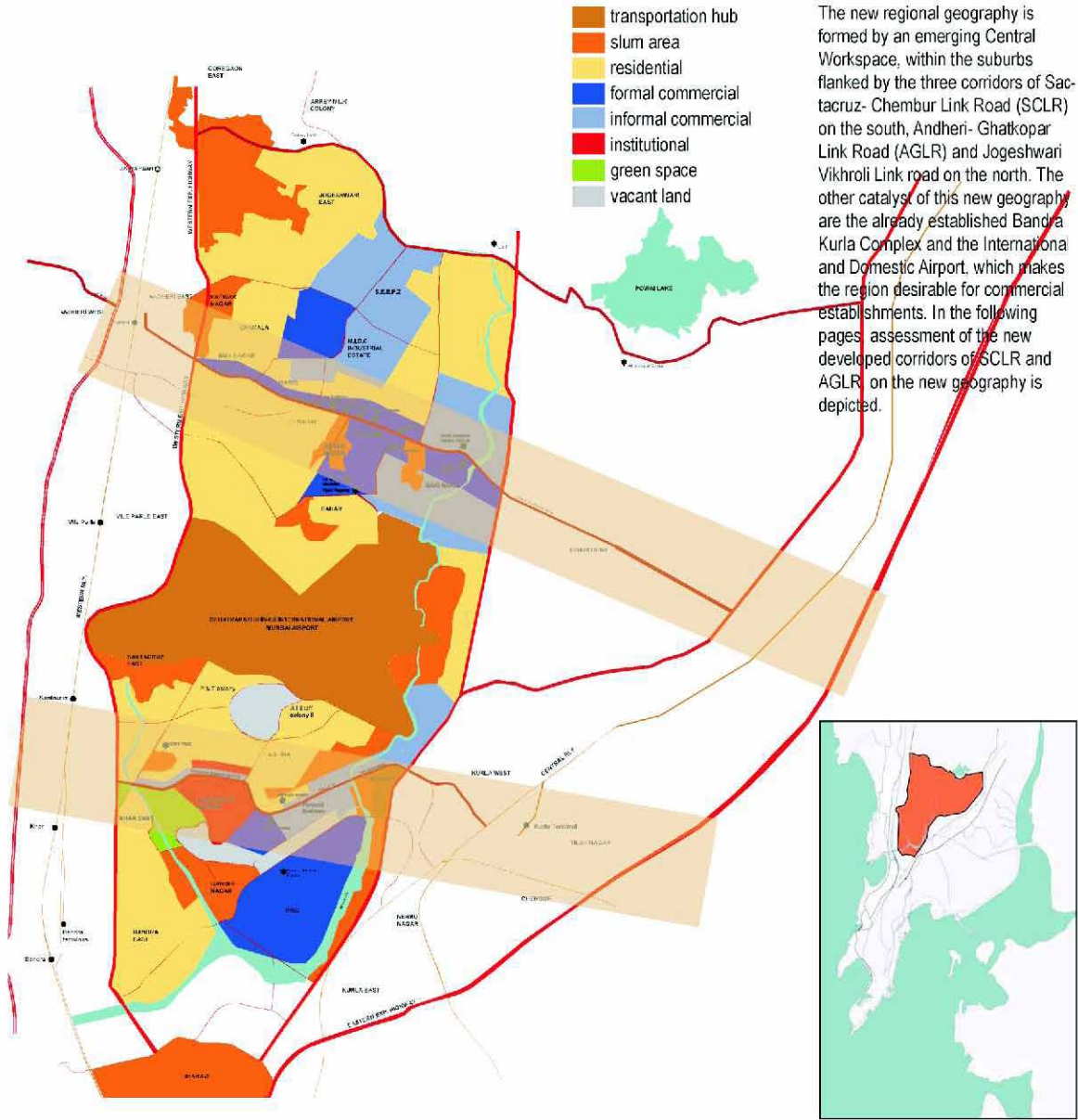
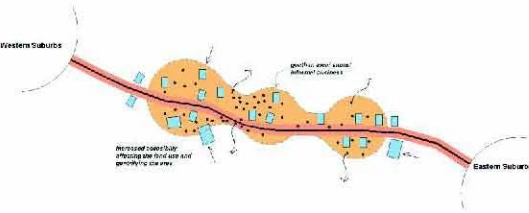
The study is based on assessment of the MUDP projects of road widening of Santacruz Chembur Link road and Jogeshwari Vikhroli Link road, as well the widening scheme by MUIP of Andheri Ghatkopar Link road, which would also be affected by the new metro link by MMRDA. The three linkages between them, formulate a region beginning from the much-developed suburban CBD of Bandra Kurla Complex and the Airport, and the special economic zone of SEEPZ. The region already has corporate commercial catalyst and along with them the specific linkages of SCLR, AGLR, and JVLR sport series of small businesses ranging from timber merchants, transports industry, trucking facilities etc.

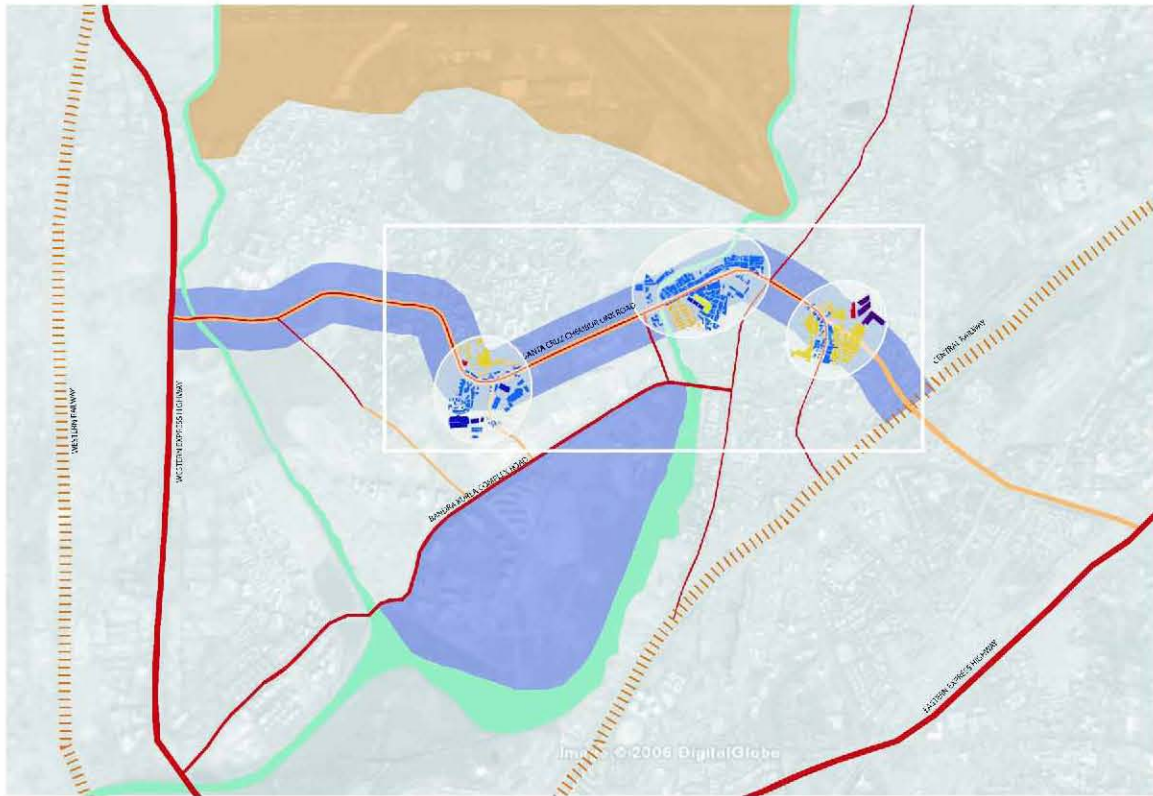
The relationship between infrastructure, activity, users and the spatial imprint of these activities and densities has been used to understand the emergent urban form and changed land use pattern. The change thus projected, is generalized to how the geography of this central region is changing, affecting the spatial geography of the whole city, with an intense commercial hub emerging in the center, while the lower middle class continuously being shifted to the periphery. The conflict thereby lies in this process of development, which is no longer talking about integration. It has been known how development of similar kinds, acts as an agent for gentrification. It is the implication of this gentrification for the city of Mumbai, which needs to be highlighted and further, studied.

Through specificity of each corridor, study examines aspect of changing shift in population, economic activity, and density, the conflicts of rehabilitation and elaborating on the specific areas of transformations in the developing corridor.

Thus, study of corridors and specific nodes is oriented towards:

- Questioning the process of gentrification that the new developed areas would undergo formulating a new city type with changing boundaries, divided on the basis of income and production.
- Loss of secondary small businesses and thereby affecting a major working class of the city
- Creation of one homogenous commercialized concentration
- Aspects of density increase in correspondence to infrastructure available or added
- Creation of new building typology, affecting the much affected public realm of the city
- Loss of the vision of social integration
- Processes and policies that are aiding gentrification





SANTACRUZ CHEMBUR LINK ROAD

The east-west linkage of Santacruz Chembur Link Road (SCLR) is connecting the western suburbs to the developing suburb- Chembur. The total length of this proposed road is 6.45 km from WEH to EEH and it starts at Dr Hans Bhugra junction on WEH before Vakola junction in Santacruz (E) and runs to the east skirting Vidyannagari campus (Mumbai University at Kalina) on its west, crosses Lal Bahadur Shastri (LBS) Marg and joins near Amar Mahal Junction on EEH. The project is proposed to be implemented in two phases. Phase I will comprise of Mithi River to EEH (3.45-km) and Phase II will comprise of WEH to Mithi River (3-km) and thereby links the Western express highway (WEH) and Eastern Express Highway (EEH).

Pracinct's Geography

The zone (as demarcated) acts as an entry into the suburb, the vehicular traffic uses these roads either to reach other destination in suburb or for going out, providing a link between eastern and western suburb through S.G Barve Marg, connecting to Santacruz. Santacruz, consisting of Vakola and Kalina has residential developments and industrial activities along the Chembur Santacruz Link Road (CST Road), with Vidyannagar, Pharmacy College, and Forensic Laboratory etc being prime educational institutions within the region. To the south is the B.K.C developed as a part of the poly-nucleated development to reduce congestion in south Bombay. Further east, is Kurla, another major suburb with old Kurla on west side is mostly occupied with slums and scrap dealers, while on the east it has developed colonies like Nehru Nagar. The 'Mother Dairy' is situated in east of Kurla area. The Mithi River carrying most of the storm water drains of the industries is on the western edge.



Socio- Economic Characteristics
68.71% are Hindu and speak Marathi (40.33%).
Strong Muslim community of timber merchants
Average monthly income is Rs 4354.78
Average number of earners per household is reported to be 1.39
Households living the below poverty line (Rs. 2500 per month) are 44.28 per cent

Project Specificities

Land Acquisition: The total area required for this project is 47856 sq.m (Pvt. Land is 11090 sq.m, rest is the 'encroached')

Impact on structure: 3412 structures will be affected

Residential: 2638

Commercial: 726

Mixed use: 25

Others: 23

Agency: MSRDC

Finance: World Bank loan, MMRDA, GOM



SANTACRUZ node 1



West of Kalina, flanking the C.S.T. road, are University of Mumbai, A.I.I, Wadia Tech. Inst., Samarth Vidyalyaya. Also is transforming industrial estate, with the Forges industries, closed since 4-5 years. Ambuja Cement industries, which have relocated to Andheri. There is middle income housing societies with major population employed in services. The node is also an employer to great number of automotive parts business on both sides of the C.S.T. road. Machado estate comprises of 72 tenants of these workshops. Located also in here are few small scale roadside restaurants, which cater to the large, working population of the precinct. There is upcoming surge of new developments, with Raheja Towers, Windsor building housing corporate offices. New offices are also coming on the immediate northern side of the link. The node is bound to experience an increase in housing stock towards the north with housing complexes such as Diamond Square already emerging towards east, while the south is commercializing on the aspects of BKC, which is its adjacent neighbour.

SANTACRUZ node 2



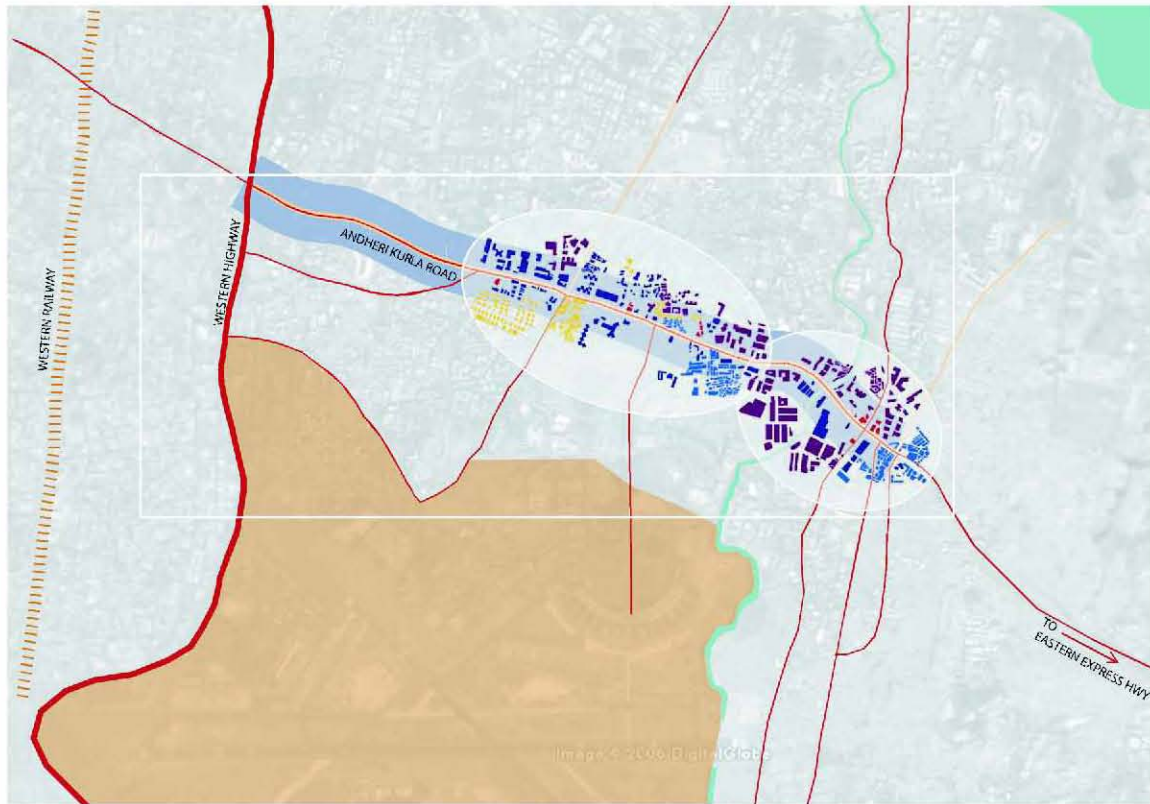
East of C.S.T. road, experiences a change in fabric with informal commercial establishments of Timber and Automotive parts dealers towards the north (Kismat Nagar) and south, towards Bus Depot, while a bulk of housing stock towards the south (Kapada Nagar). Mithi River flanks the node on the west with the Mithi River cleaning-up project already in its beginning and having lots of slums and workshops towards east, already demolished. The widening of the road, would affect the northern edge of this S.G. Barve Marg, demolishing the timber and automotive parts gallas. Proposed on that site, are recreational green and a recreation ground, according to the D.P. Sprouts of development have begun on the south with an SRA scheme, with sale commercial component dropping the slums/workshops in its completion phase.

SANTACRUZ node 3



Beyond L.B.S. and New Mill Road, the proposed SCLR follows the existing S.G. Barve Marg to a length of about 150 meters and beyond a new road is proposed through slums and crosses the Mumbai Kalyan Central Railway (Main) line. The new road is laid through Buden Colony, housing a minimum of 3000 slum dwellers, who are employed in services, with few existing commercial establishments in Kurla. The node has the known Vinayak temple, Buddhist temple and a Masjid, which are the only structures left behind after the demolition in the 150' width of new road. Along the S.G. Barve marg, leading towards the Kurla station are housings, commercial establishments and a large market precinct.





ANDHERI GHATKOPAR LINK ROAD

The zone, defined by Andheri Ghatkopar Link road, Mumbai Airport on the south of it, and the special economic zone of S.E.E.PZ on the north of it, is experiencing heavy commercialization and de-industrialization of the zone, after the new D.P. Two simultaneous projects of the road-widening scheme by MUIP and as well as Metro Rail project by MMRDA are projected on this corridor. The two projects aim at better connectivity between the eastern suburb of Ghatkopar, to the western suburb of Andheri. The two infrastructure projects cater to Versova, towards the extreme east, Andheri, Chakala, Marol Naka, Saki Naka, Subhash Nagar and finally to Ghatkopar. Thus the stretch would hold a widened road and an elevated metro flyover.

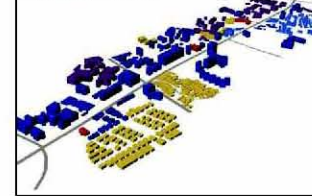
Precinct's Geography

In this highly commercial area, through the stretch of the corridor, kind of commercial activities also changes. Towards the west, bounded by the Western Express Highway, corporate commercial activities spring up. This stretches onto J.P. Nagar, which is

a residential zone, catering to middle-income and lower income class. It is beyond J.P. Nagar, that the International Airport that has given impetus to the hotel activities in the vicinity of the same. Five-starred hotels like Hotel Leela are already constructed in the locality. The Sahar road, which connects the Andheri railway station to the Airport, is important link connecting western express highway to the Airport. Towards the north of the corridor, exists the Industrial estate of primary Pharmaceutical companies, which are slowly transforming like the new Logitech Park (BPO) in the south of the corridor and Leela Business Park on the north. New housing typologies, with High-end apartments are also taking place of derelict industries. Further towards the east, fabric of the area transforms, with small-scale industries in the Marol and Saki Naka. These are gaathan areas, where developments is primarily of ground floor structures having very less maneuvering areas. Beyond and behind these establishments catering to transport industry (trucking), are the slums residential of the employed.

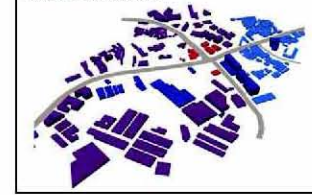


ANDHERI node 1



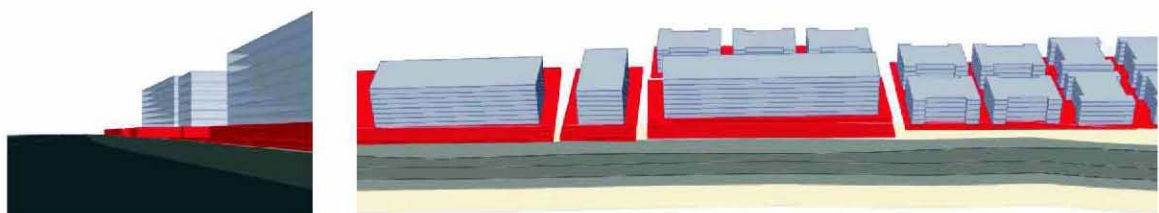
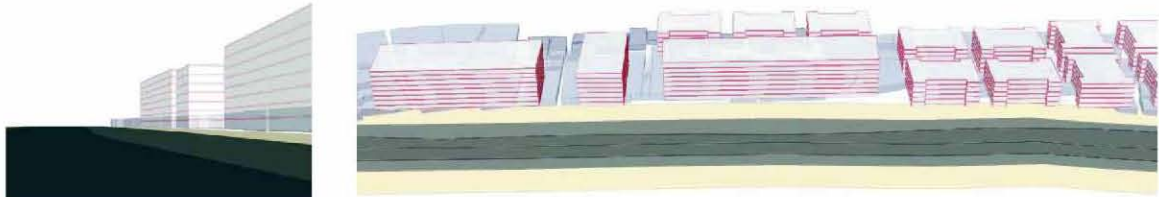
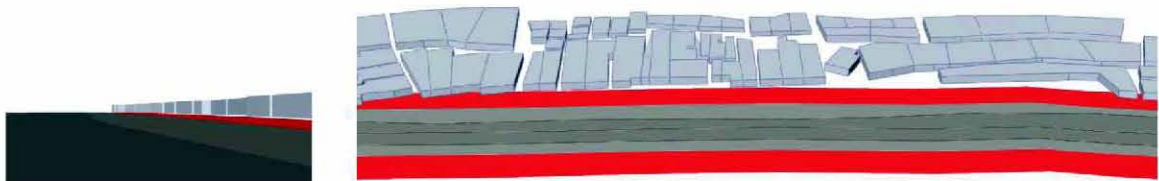
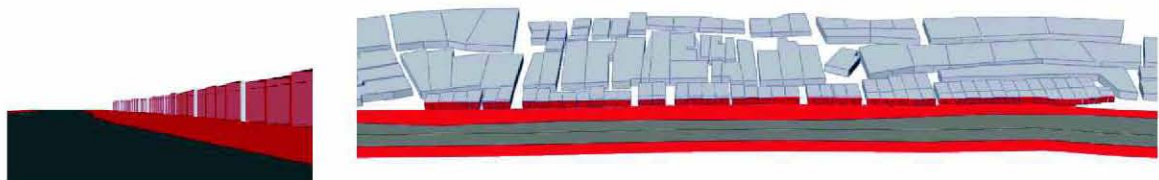
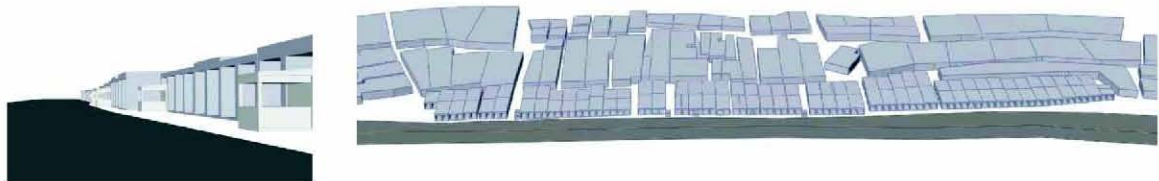
Stretch defined by J.P. Nagar on the west and to Saki Naka on the east is a perfect exhibition of the uneven grain and texture in the area. With both large floor plates new commercial activities and dense fabric of industrial developments are seen in the stretch. It's a heterogeneous mix of residential, corporate commercial, small-scale businesses and pharmaceutical industries that are now transforming. Prominent in this stretch are hotels such as Leela and Kohinoor Continental. New commercial establishments such as Leela Business Park, Dynasty, Sahar Building type the area. Further towards the east, are located few functional industries. Public institution of small scale industries and small scale business of transport in Saki Naka.

ANDHERI node 2



The zone is highly active with commercial establishments of trading companies, tiles, plywood dealers, and other ancillary functions. Located here are also corporate housing for middle-income and lower-income sections. At present proper infrastructure in respect to sewage, road etc. is lacking in this zone, and area is extremely packed.





EMERGING TYPOLOGIES

EXISTING CONDITIONS

Majority commercial businesses and informal stands
 Typical formal shop single user space 600 sq ft area, single story height
 Typical informal stands 2.5m x 2.5m
 Road width 60', two lane divided



factor 1: ROAD WIDENING

Road widening to 150' results in partial or full demolition of formal shops
 Reduce shop size by 60-100% (with or without relocation)
 Complete removal of informal shops



factor 2: NEW INFRASTRUCTURE

Increased setback up to 60' for retrofitting or rebuilding of drains and other infrastructure
 Near total removal of street side shops and some housing/commercial behind



factor 3: CHANGING BUILDING REGULATIONS

Increase in FAR
 Building typology changes due to greater allowable height + greater footprint area
 Change in land value results in interest from corporate sector
 Increase in corporate office buildings or office parks, typically single use



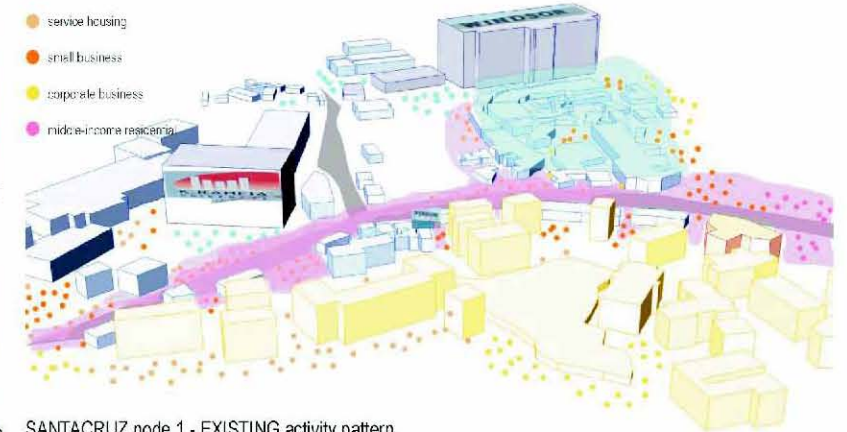
factor 4: INTERIORIZATION OF SPACE

Desire for security and parking results in increased footprint around building footprint
 New typology of gate + fence/wall+ security guard booth
 Businesses have minimal interaction with street and surrounding business
 Lack of secondary service businesses and housing

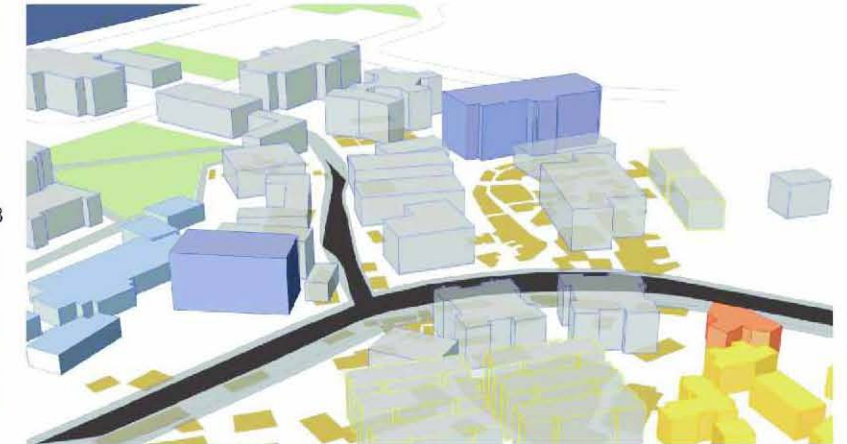




- public institution
- service housing
- small business
- corporate business
- middle-income residential



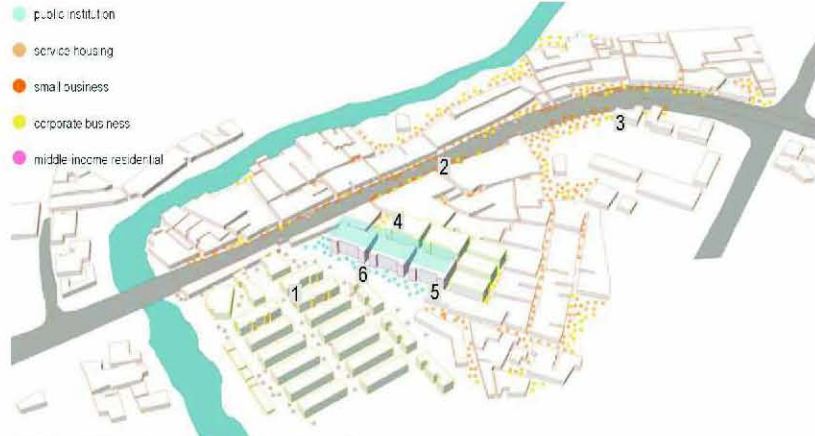
2 SANTACRUZ node 1 - EXISTING activity pattern



3 SANTACRUZ node 1 - FUTURE geography

The road is busy at this junction, with automotive parts galas spilling over the road, resulting dense accumulation of workers/ consumers/ and cars north and south of C.S.T. road. Other ancillary facilities, which cater to the large working and student population are in the area. Major consumers are local middle-income residents. The zone is heterogeneous mix of various users.





SANTACRUZ node 2 - EXISTING activity pattern



SANTACRUZ node 2 - FUTURE geography

The zone is flanked with commercial establishments of Plywood and automotive parts, which spill over the road edges, behind which run middle income housing societies and workshops/slums of the people employed in the establishments. It is a highly active zone, with economic and residential activities marking the area.



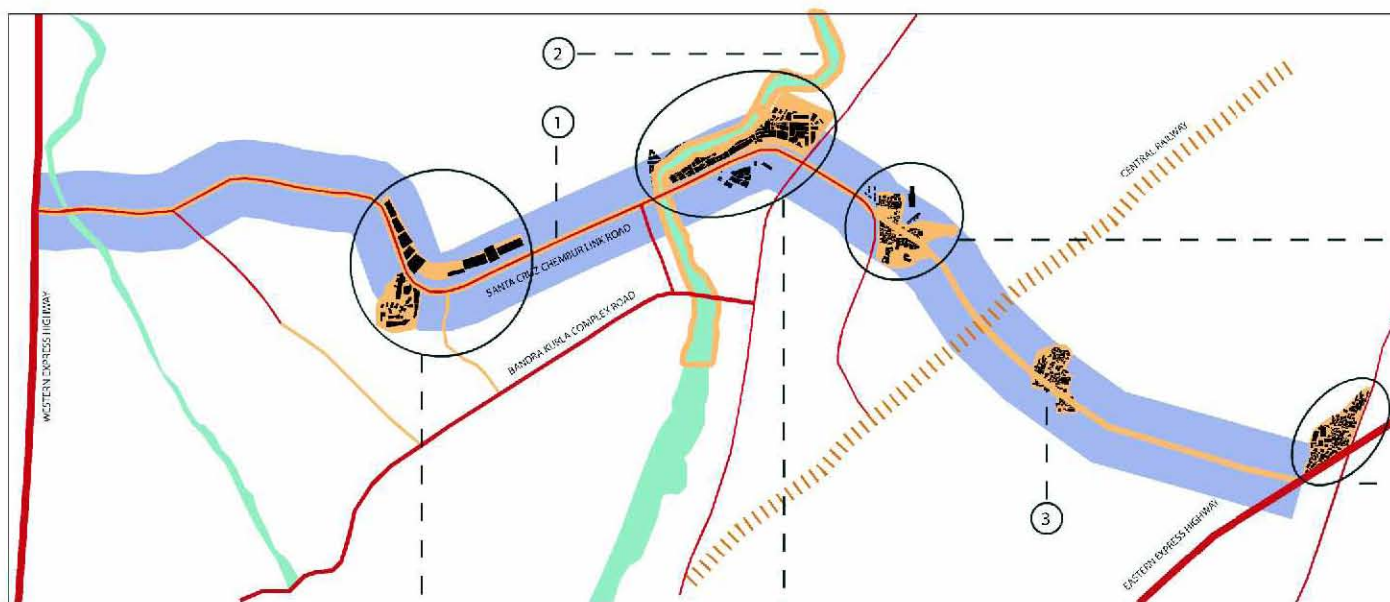
SANTACRUZ node 3 - EXISTING activity pattern



SANTACRUZ node 3 - FUTURE geography

The zone is active till the New Mill road, and further on the S.G. Barve Marg towards the large market, near Kurla station. Between these two extremes lie the residential slum establishments of Buddh colony, few commercial establishments of general convenience on the road edge, and middle-income housing. It is active residential zone, and caters to mixed user group.





KISMAT NAGAR commercial

Galas of automobile parts (20 shops) and plywood (150 shops)
Site-specific, established businesses

Rehabilitation provided in Mankhurd
Gala size provided is inadequate
Owners demand rehabilitation on the same corridor or legalisation of the rest of the property

REHABILITATED to MANKHURD - XX km

PANCHSHEEL NAGAR industrial

Residential and household industries

Few affected have been shifted to Mankhurd
Not all have been adequately rehabilitated
Work and education requires great travel time and distance

REHABILITATED to MANKHURD - XX km

BUDDH COLONY residential

Residences of people in service, shopkeepers, etc

450 households demolished
Those demolished rehabilitated to Mankhurd

21 SRA scheme, 407 tenants per building
Buildings face main road with commercial sale component

REHABILITATED to MANKHURD - XX km

MANKHURD



MACHADO ESTATE commercial

Galas of automobile parts, 72 tenements

Owned by Samtha Industries to develop on-site rehabilitation

Site specific business will not be rehabilitated in accordance to existing gala size



1. Informal shops of automobile and restaurants given 'unauthorized status' in order to accommodate road widening. Shops which are not completely demolished by road widening may not be rehabilitated, even if loss of shop area can be up to 60%

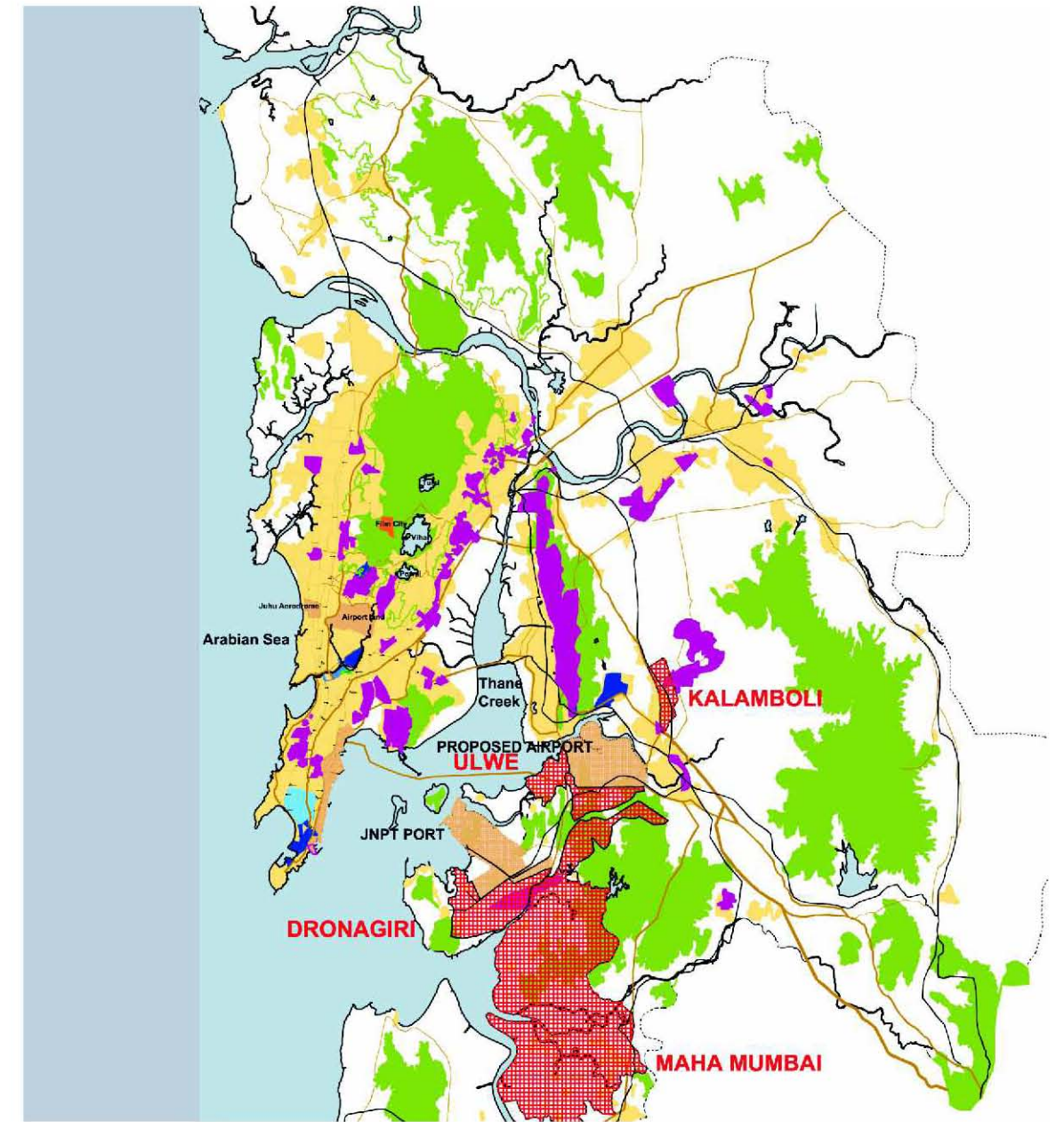
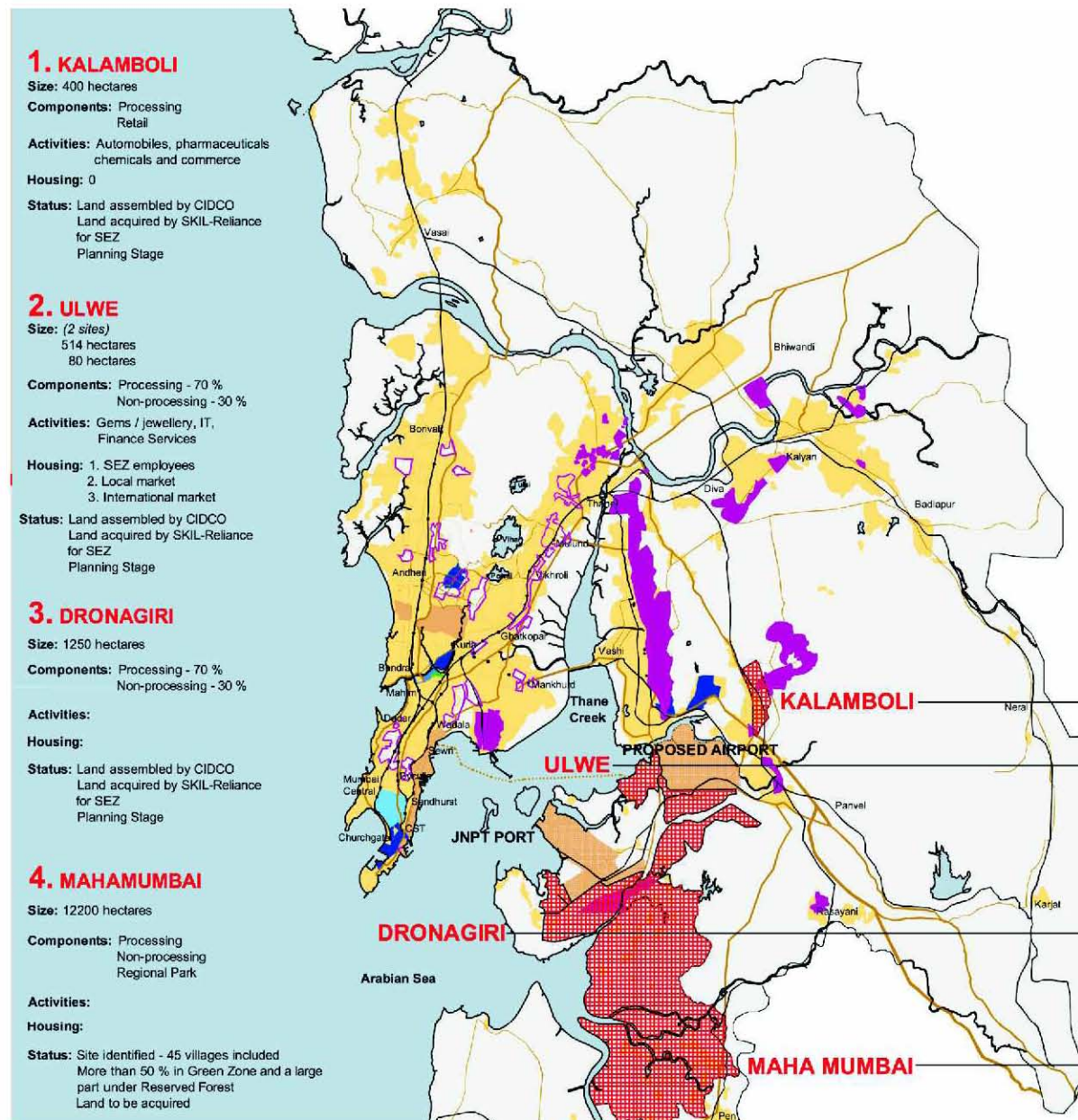
2. Displacement of homes and businesses to Marul and Mankhurd due to widening of Mithi River

3. Homes and businesses demolished in areas where east-west roads being constructed to connect to the Eastern Express Highway



MANKHURD

A plot of land at Mankhurd Plot of 38,297.5 sq m area under Option B has been selected for constructing permanent tenements and commercial units for residential hutments and shops affected by Santacruz Chembur Link Road Phase I Project (SCLR). MMRDA has also decided to provide permanent units for residential and commercial structures for the people affected SCLR project to this site after subsequent discussions and consultations with PAHs, NGO and MMRDA regarding suitability of site and availability of the structures. The construction of houses has been completed. The complex is known as Lalachai Amerchand Compound. Each Building has 144 apartments, where: Office (galas) occupies the ground floor: 4 in number; Residential: 140. Problems faced by relocated population is primarily loss of their economic activities, and business contacts as well as no public facility of schools, colleges, hospitals etc in the close proximity, because of which the travel to the city is unavoidable and tedious.



LOCATION OF SEZ IN THE MMR

URBANISATION OF SUB-DISTRICTS



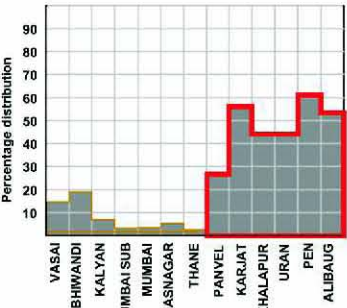
RAIL



ROAD



URBANISATION OF SUB-DISTRICT



| | | | | |
|-------------------|--|--|--|--|
| G. Mumbai | | | | |
| Vasai - Virar | | | | |
| Kalyan - Bhiwandi | | | | |
| Karjat - Badlapur | | | | |
| N. Mumbai | | | | |
| Pen - Alibaug | | | | |

AGRICULTURAL ECONOMIES IN THE MMR